

Pre-Proposal

Airborne Electromagnetic Survey Data Acquisition and Processing in the 600 Area

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Statement of the Problem

The Hanford Site operational setting is in a windy, arid, high desert climate with asphalt, gravel, and dirt road conditions. The general geologic setting in the 200 East Area includes basalt bedrock approximately 600-700 ft below ground surface (bgs) in the south to 60 ft bgs in the north. The basalt is overlain by gravel, sand, and clay deposits of the Ringold formation and those deposits are overlain by thick (100- 400 ft) heterogeneous glacial fluvial gravel, cobble, and sand deposits of the Hanford formation. The water levels range from 330 ft bgs in the south to 215 ft. bgs in the north.

The subsurface contains several geological features that have some control on groundwater flow and contaminant transport. These include channeling in the sedimentary deposits, folding of the basalts, and neogene faulting. These features need to be determined to understand the groundwater system in order to better understand the subsurface stratigraphy and to evaluate the potential for preferred vertical and horizontal pathways for mobile contaminants in the deep vadose and groundwater intervals. To date, the primary source of data used to characterize the geologic nature of the subsurface has been borehole data.

This proposal addresses the application of electromagnetic (EM) geophysical techniques to provide information on the subsurface between boreholes. Airborne EM data can be used as a cost-effective approach to screening a large operable unit area in a short amount of time to help focus future investigation efforts. The acquisition of EM data collected at ground surface, has been used at Hanford for the delineation of disturbed areas. On other project sites, EM has been used for the delineation of anomalies associated with locating potential contaminant pathways, identification of clay filled channels, identification of faults and basement rock, identification of well head locations for decommissioning, and identification of pipeline corrosion.

Proposed Approach

An airborne EM survey of approximately 30 square miles (or approximately 120 fly miles) is proposed in the 600 Area of the Hanford Site adjacent to the Columbia River (Figure 1). The primary goal of this work will be to demonstrate that the airborne EM data acquired and processed can be used to characterize anomalies associated with stratigraphic variation and possible preferred groundwater flow paths, buried channels, faults, depth to bedrock, and faults in the 600 Area adjacent to the Columbia River.



Figure 1 600 Area EM Survey Location Map

A contractor with experience in this type of work will acquire and process data at a resolution depth of 75-1000 ft. for a Phase I study. These results will be evaluated by FH and an assessment will be made on the feasibility of further characterization by this geophysical method. If FH determines the approach to be feasible, approximately 150 square miles of additional airborne EM data may be initiated in a separate Phase II SOW.

Testing of various sampling arrays may be necessary to produce the best results. The contractor shall conduct field testing as needed to determine optimum data acquisition parameters. The Contractor shall provide Global Positioning System (GPS) surveyed locations of each line and associated data reference points for EM survey data recovery for site Geographic Information System (GIS) mapping and interpretation software applications.

Schedule, Budget, and Deliverables

This work will be completed by May 30, 2007. The budget for this project is approximately \$350K.